Section I: General Information Required

A. Project Title: Cozad Center Technology Access

Name of Submitting Entity: Euducational Service Unit 10
Project Contact Information:
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Total Funds Requested: $24, 657

Section II: Executive Summary

Personnel at ESU 10 and at the Cozad Center are collaborating to solve the problem of unreliable Internet access currently experienced by the Cozad Center, Cozad Public Schools, and the Wilson Library in Cozad. With the existing connection, no effective way to manage the current system has been discovered. A wireless protocol will enable Educational Service Unit 10 to administer the network, to provide adequate and timely Internet browsing, and to collaborate in providing a filtering solution, especially important to protect young clients of the Wilson Library, Cozad Center, and Cozad Public Schools.

The system will require installation of an omni-directional antenna at the High School, with directional antennas at the Elementary Schools, the Wilson Library, and the Cozad Center. The project will provide high-speed Internet access and allow data access between the remote sites. Design, configuration, and installation will be coordinated by Educational Service Unit 10 and assisted by participating entities and contractors.

Section III: Goals and Objectives

The project will eliminate the frustrating inconsistent connectivity that pervades the current network. Students at the Cozad Center and at Cozad Public Schools, as well as clients of Wilson Library and the city offices, will be able to access Internet connectivity easily and efficiently through a wireless protocol. Young clients of the schools and library will have protected access through software that provides Internet filtering. Educational Service Unit 10 personnel will provide network management, ensuring seamless delivery to the above sites. This is the goal of the project.

The wireless equipment operates in the unlicensed 2.4 GHZ ISM band, which allows for the use of the bandwidth without the expense of buying or applying for licenses. The project will use Frequency Hopping Spread Spectrum (FHSS) radios using the unlicensed 2.4 GHz ISM band. One omni-directional antenna will be located at the High School with directional antennas at the remote sites, including the Elementary Schools, Public Library and Cozad Center. This project will provide high-speed Internet access (3 Mbps) and allow data access between the remote sites.

The technology will provide four times the current bandwidth for the Elementary Schools, the Wilson Library, and Cozad Center. This will eliminate Internet access fees to the Library and Cozad Center. Leased circuit fees for all remote entities will also be eliminated. This access is compatible with the entities' technology plans.

The costs for the project will include the radios, antennas, a mast or tower, and other various network equipment, cables, and supplies to each location. Design, configuration and installation will be coordinated by ESU 10 with assistance by participating entities and contractors.

Objective 1. All students and personnel from the schools and library will have opportunities to search for sites and to browse the Internet.

NITC 1: The project will improve data access between the remote sites.
The project will expand citizen access to government information by providing consistent connectivities.
The project will broaden educational opportunities to include expanded access to educational and training opportunities.
The project will enhance service to Cozad and its citizens

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NITC 2: The project will provide new ways to aggregate demand, reduce costs and create city-wide support networks.
The project will improve collaboration between school facilities and the library.
The project may encourage more competent service within the community.

NITC 3: The project will encourage the appropriate use of information technology in education and government service.
The project will enable long-term infrastructure improvement.
The project will support rapid deployment of appropriate technology and reduce cumbersome service.

CC 1: The project will ensure access to public and private services for citizens of Cozad through appropriate and efficient use of information technology.

CC 2: The project will promote the development of an infrastructure including sufficient bandwidth, that is secure, affordable, reliable and responds to specific needs.

CC 3: The project will stimulate development of a workforce knowledgeable of and fluent in use and applications of information technology.

CC 4: The project will facilitate development and innovation by raising awareness, sharing information, and encouraging collaboration.

Objective 2. Students and personnel from the schools and library will be able to receive and send e-mail messages.

NITC 1: The project will provide expanded access between the remote sites.
The project will expand citizen access to government information by providing consistent connectivities.
The project will broaden educational opportunities to include expanded access to educational and training opportunities.
The project will enhance service to Cozad and its citizens
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NITC 2: The project will provide new ways to aggregate demand, reduce costs and create city-wide support networks.
The project will improve collaboration between city offices, school facilities, and the library.
The project may encourage more competent service within the community.

NITC 3: The project will encourage the appropriate use of information technology in education and government service.
The project will enable long-term infrastructure improvement.
The project will support rapid deployment of appropriate technology and reduce cumbersome service

CC 1: The project will ensure access to public and private services for citizens of Cozad through appropriate and efficient use of information technology.

CC 2: The project will promote the development of an infrastructure including sufficient bandwidth, that is secure, affordable, reliable and responds to specific needs.

CC 3: The project will stimulate development of a workforce knowledgeable of and fluent in use and applications of information technology.

CC 4: The project will facilitate development and innovation by raising awareness, sharing information, and encouraging collaboration

Objective 3. Students and personnel from the schools and library will have adequate filtering to provide a safe Internet environment, as required by federal law.

NITC 3: The project will encourage the appropriate use of information technology in education and government service.

CC 1: The project will ensure access to public and private services for citizens of Cozad through appropriate and efficient use of information technology.

CC 2: The project will promote the development of an infrastructure including sufficient bandwidth, that is secure, affordable, reliable and responds to specific needs.

CC 3: The project will stimulate development of a workforce knowledgeable of and fluent in use and applications of information technology.

CC 4: The project will facilitate development and innovation by raising awareness, sharing information, and encouraging collaboration

Section IV: Scope and Objectives

1. Beneficiaries will be students and personnel at Cozad Center, Cozad Public Schools, and Wilson Library, who will obtain Internet reliability and connectivity. The consistent quality of service management provided by Educational Service Unit 10 will increase productivity, quality and quantity of research, and confidence in filtering software.

2. An expected outcome of the project is that the wireless protocol will offer a reliable and efficient means of providing students and personnel at Cozad Center, Cozad Public Schools, and Wilson Library with Internet connectivity that is available upon demand. Greater bandwidth will permit uncomplicated data access. A second outcome of the project is that Educational Service Unit 10 will effectively manage the network, thus eliminating current problems of uncertain connectivity.

3. Documentation of time and progress will be provided through use of ESU 10's project tracking software, HelpSTAR. Surveys of Cozad Center personnel, Cozad Public Schools personnel, and Wilson Library personnel will query the efficiency and reliability of the network, and of the filtering software that protects students from undesirable sites and connections. Network performance monitoring will be performed; documentation will be provided for the budget and any other work that the project requires.

4. A constraint to the project exists in the possibility of choosing much more expensive methods of changing the current system. The wireless protocol is less expensive, provides adequate bandwidth, and will not lack reliability. It will also facilitate administration of the network, thus solving or eliminating any sources of problems with reception and transmission.

5. A significant assumption relating to this project is that doing nothing would simply perpetuate the current situation. This would be an unsatisfactory solution.

Section V: Project Justification

1. Cost analysis: The entire project will cost $45,807, and will benefit an entire community, including the schools and the library. The filtering solution that will comply with federal law will be reliable and will solve that particular problem for both schools and library. Expected life of the system would be seven years, creating benefits in reliable access and appropriate bandwidth that far exceed the cost per year. Technology advances will prompt upgrading, such as providing additional bandwidth, and the system will have to be scaled and modified to add bandwidth..

2. This proposal is essential to provide Cozad students, school personnel, and library personnel with an Internet connectivity solution that is consistently available upon demand, and with sufficient bandwidth to permit data access.It will also comply with federal law in providing filtering protocol to protect student access.

3. The limited amount of time that students are able to devote to Internet research and browsing must be utilized in the most efficient fashion possible. In addition, the filtering software will comply with school and library needs to offer safe, unpolluted access for young clients.

4. Efficient use of funds is a second concern. The wireless network is the least expensive and most efficient solution to provide Internet access on demand; network administration by Educational Service Unit 10 will provide reliable transmission and reception of data. Other solutions were not considered as reasonable or viable. Since the current connectivity is unreliable and inconsistent, doing nothing would perpetuate a problem, rather than solving it.

5. The federal mandate that is being addressed is to provide adequate filtering software in the Cozad Center, Cozad Public Schools, and Wilson Library for the purpose of protecting young clients from undesirable Internet sites and connections.

Section VI: Implementation

1. The project is being directed by personnel of Educational Service Unit 10, and is accepted as a viable solution by the Cozad Center, Cozad Public Schools, and Wilson Library.

2. The technology offices of Educational Service Unit 10, well-known and highly respected throughout the State of Nebraska, will design and implement the project. Network Engineer Ron Cone, of ESU 10, has been instrumental in collecting data on materials and costs for the project, and, with the Educational Service Unit 10 technology staff, will assume responsibility for its completion.

3. Milestones:

a. Installation of the network antennas…… June, 2001
b. Testing of the installation…….July, 2001
c. Utilization of the system……...July, 2001
d. Assessment of system success……. October, 2001

4. Training and development requirements: None will be needed.

5. Maintenance and ongoing support will be provided by the technology staff of Educational Service Unit 10 and collaborating entities.

Section VII: Technical Impact

1. Hardware, software and communications requirements are 1) a wireless base station, 2) six wireless subscriber units, 3) seven tripods and poles, 4) an omni-directional antenna, 5) two firewall/routers, 6) remote power modules, 7) equipment racks, 8) an Ethernet switch, and 9) a wireless network adapter. The data networks will be provided by Cozad City Schools and ESU 10.

2. The needs of the users are for reliable, secure network connectivities and adequate bandwidth for data transmission. These will be supplied through the installation and operation of the proposed solution. The filtering software will fulfill a mandate that requires protection for young clients, and is highly appropriate for this purpose.

3. The issues at stake with this installation are reliability of Internet access and security for clients at the Cozad Center, Cozad Public Schools, and Wilson Library. Educational Service Unit 10 has the expertise and experience to manage this network, and to fulfill the needs of the clients.

4. The key technologies will provide four times the current bandwidth for the Elementary Schools, the Cozad Public Library, and the Cozad Center. This technology will eliminate Internet access fees for the Library and the Cozad Center. It will also eliminate leased circuit fees for all remote entities.

5. This system is totally compatible with existing technology at Educational Service Unit 10, and the NITC statewide infrastructure requirements.

Section VIII: Risk Assessment

1. Risk assessment that has been performed on this project includes careful consideration of the appropriateness of each item of equipment, its strategic placement in the designated sites, and the installation and maintenance details that will provide consistent and reliable service.

2. Identify the risks and give importance of each:

a) Inherent in any antenna configuration are the risks of the forces of nature including, but not limited to, lightning and wind. Without proper precautions, these could be a moderate risk.

b) Frequency saturation and structure interference between sites, plus distance limitations may also be a medium risk for the project.

3. Identify strategies which have been developed to minimize risks

a) Forces of nature will be addressed by securing antennas and masts to building structure. Lightning suppressors are also built into the wireless equipment and will shut down if enough static electricity is present. Installing intelligent power units will allow the equipment to be reset remotely in the event the equipment does shut down.

b) Using the 2.4 GHz ISM band allows any entity to place equipment that might interfere with the signal on this system. Thus, using the frequency hopping spread spectrum radios will allow the system to use the full range of frequencies rather than a small range or channel. Also, the units will adapt to interference and avoid frequencies that are continually causing interference.

Structures that might pose line of sight problems may be overcome with taller masts or the use of antenna towers. Also, the use of GPS mapping software in the design adds valuable information and detail when selecting the placement of antennas.

The system may also be scaled and/or replicated to sites that have similar networking needs. The existing equipment can be used to reach sites as far as fifteen miles away with the proper antenna. Also, sites requiring larger, dedicated bandwidth may choose to use point to point connections in the future.

4. The impact if project is not completed as promised would be continuation of inconsistent and unreliable Internet connectivity that interferes with student research and Internet browsing, and Cozad Public Schools, Cozad Center and Wilson Library communications. The schools and the library would have to find reliable software solutions that comply with the federal filtering mandates.

	CTF Grant Funding	Cash Match (5)	In-kind Match (6)	Other Funding Sources(7)	Total
Personnel					
Contractual Services					
• Design			2000		2000
• Programming and Testing			4000		4000
• Project Management, evaluation, and quality assurance			2400		2400
• Other			2500		2500
• Benefits			1848		
• Contractual Ser. Totals			127418		10900
Capital Expenditures(3)					
• Hardware Acquisition	25657				25654
• Software Acquisition					
• Network costs					
• Other					
• Capitol ExpenseTools	24675				24657
Other Costs					
Telecommunications			7900		7900
Supplies and materials			300		300
Other operating (4)			5000		5000
Travel			500		500
PROJECT TOTAL	24657		26448		51105

Section IX: Financial Analysis and Budget

		Totals:
Contractual Services include:		
Design: 40 hours @ $50	$2,000.	
Programming and Testing: 80 hours @ $50	4,000.	
Project Management: 32 hours @ $50	1,600.	
Evaluation and Quality Assurance: 16 hours @ $50	800.	
Other includes Antenna Installations by AxtellTech	1,500.	
and Electrical Installations by local electricians	1,000.	
Benefits: (ESU personnel—22%)	1,848.	$12,748
Capital Expenditures include Hardware:		
1 Wireless Base Station	2,595.	
6 Wireless Subscriber Units	9,570.	
7 Tripods and poles	2,000.	
1 Omni-directional Antenna	640.	
2 Firewall/Routers	3,000.	
7 Remote Power Modules	3,752.	
1 Equipment Rack	800.	
1 Ethernet Switch	2,000.	
1 Wireless Network Adapter	300.	24,657.
Other Costs:		
Telecommunications:		
Cozad City Schools Data Network	5,400.	
ESU 10 Data Network	2,500.	
Supplies and Materials	300.	

Other:		
ESU 10 Integration Support/Maintenance: 60 hours @ $50.	3,000	
Participating Entities Integration Support: 40 hours @ $50	2,000	
Travel (Mileage @ $.34 per mile)	500.	13,700.
TOTAL COSTS		51,105.

Total Grant Costs:	$24,657.
Total In-kind Costs:	26,448.

Financial Narrative Notes:

1. *Please include estimated number of hours or full-time equivalent (FTE) by position. Include separate totals for salary and fringe benefits. If it is necessary to itemize on a separate sheet, include only the subtotal in this table.*

Estimated time to implement the project is approximately 21 days. The in-kind matching funds are for Design, Programming, Installation, and Project management. Most of the service will come from the ESU staff, with a few services from other contractors. Cost calculations have been done using $50 per hour, plus 22% benefits, which aligns with benefits for the ESU salaried staff. Ongoing maintenance of the network is listed in Other Operating Costs. See more detail about the ongoing costs in item 4.

2. *Please itemize other contractual expenses on a separate sheet.*

See Budget sheet for itemized contractual expenses. Antenna installations will be performed by AxtellTech for each location. Any additional electrical circuits needed in specific locations will be contracted with a local electrician. Benefits for ESU 10 salaried employees have also been listed.

3. *Please itemize capital expenditures by categories (hardware, software, network, and other) on a separate sheet.*

See Budget sheet for listing of anticipated Capital Expenditures by category.

4. *Please itemize other operating expenses on a separate sheet.*

Anticipated Other Operating Expenses include some network integration support for the existing infrastructure that will be using the new wireless network to insure network interoperability between the networks. Entities that will be using the wireless network will be assisting ESU 10 in implementing this network for them. Personnel, including LAN Managers, at each site will also be contacted for assistance in troubleshooting network performance and hardware issues if there are problems.

5. *Please indicate the source of any cash match.*

No sources have been identified for cash match.

6. *Please indicate the source of any in-kind match and how it will be documented.*

In-kind Matching funds will include time spent on the project by ESU 10 personnel. This may include a number of technicians from the ESU 10 Helpdesk as their technical skill is needed. Matching funds will also include the use of the existing telecommunications infrastructure; hardware, and software for design, and installation; and testing the new network and its components. Network performance monitoring will also be performed and included with the existing monitoring application. Documentation of time and progress will be provided through the use of ESU 10's project tracking software HelpSTAR. Additional documentation will be provided for budget and other work that is spent on the project as the grant requires.

7. *Please provide a breakdown of any other external funding sources. Sources of external funds may include grants from federal agencies or private foundations.*

See the Budget sheet for specific items. Other funding sources include the use of the Cozad High School's existing Internet connection from the Tri-Valley Distance Learning Consortium and any other personnel time from other participating entities that assit with the implementation of the wireless project.